

THE REHAB CODE: MAKING IT WORK FOR YOU

PREPARED BY  
CITY OF RICHMOND  
DEPARTEMENT OF COMMUNITY DEVELOPMENT  
BUREAU OF PERMITS & INSPECTIONS

FOR THE  
GOVERNOR'S CONFERENCE ON HOUSING  
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## CHAPTER I WHAT IS THE PROBLEM?

### Introduction

A jurisdiction's economic vitality is dependent on its ability to keep its existing buildings occupied. This has been true historically and is true today. In Silicon Valley, the demise of the "dot comers" two to three years ago left a lot of vacant buildings. Californians named them "see through" office buildings. In an attempt to get these buildings reoccupied San Jose, and other jurisdictions, have streamlined many of their regulations. These initiatives have resulted in an impressive 10% Reoccupancy rate a year later. Cities in Virginia have similar problems with vacancy rates as businesses have moved or folded. Certainly the City of Richmond is no exception. We too are faced with the problems created by vacant buildings

Many of the buildings standing today will outlive their current use. As a result, either another type of use will occupy the space or the buildings will remain vacant. Compounding the problem, many of the buildings that under construction today will outlive their original purpose. The needs of business and commerce have changed in the past and are continuing to evolve. Cities are losing the manufacturing jobs that once provided their economic base and the overall economy are changing from a manufacturing based economy to a service based economy. This fundamental change means that buildings designed and built for the old economy will remain vacant until they can efficiently be made to meet the needs of the new economy.

Renovating an existing building for a new use is a delicate economic balance. Businesses are faced with the expenses associated with renovating the building to meet their existing and projected need. In many cases this means meeting the requirements of codes and regulations that were not in effect when the building was built. In an effort to soften the economic blow of renovating these existing buildings. Some jurisdictions have tax abatement incentives, historic tax credits and other initiatives designed for foster reconstruction and redevelopment.

Despite these incentives, businesses may still find that the costs of renovating an existing building may be higher than those of construction a new building. This does not always mean that the construction of a new building is an approach selected. Many of the factors of convenience and proximity to the amenities of the City that caused the buildings to be building initially remain attractive to today's businesses and residents. As a result, we in the City of Richmond are finding that people who enjoy living and working in these efforts are beginning to drive a market for redevelopment. The challenge to us as City employees and Code Administrators is to find a way to minimize the premiums paid for redevelopment over new construction so that this fragile demand for redevelopment is not obliterated.

It is in this spirit of working together to control the costs of redevelopment that I welcome you to this seminar. The Virginia Uniform Statewide Building Code contains special administrative and technical features that enable developers to reuse existing buildings. I plan to show you how the City of Richmond uses these codified techniques and provisions as well as our own internal policies to control costs associated with reconstruction and to assist developers in economic renovations of existing buildings.



### Differences between rehabilitation and new construction

There are some inherent differences between new buildings and older buildings.

First, many buildings were constructed during a time when heavy wood and masonry were the predominant buildings materials. Wood was plentiful, inexpensive and easily worked. Wood buildings were used for all types of uses including mercantile, storage and manufacturing. These buildings typically have masonry exterior walls, heavy wood columns, wood floors etc.

However, the wood was not fire fireproof. This is the reason masonry was used. Masonry was fire proof and contained the spread of fire. Fire was the primary threat and building codes required that buildings be designed to contain the spread of fire. The philosophy of the code was that if a building caught fire, it could burn to the ground; but the fire would not spread to other buildings in the City. This type of construction is typically referred to as "Mill Construction". It is common for buildings constructed prior to World War I period and is found in the older urban areas. Today, the International Code classifies these buildings either as IIIB or IV type of construction.

Older buildings were constructed to be suitable for manufacturing and commerce. Cities were the center of manufacturing and commerce. Retail stores were typically three and four stories high. Merchants used the upper floors for stocking inventory or as a residence. There were no rated floor-ceiling assemblies, stairwells were open, hallways had transoms that substituted for air conditioning and shafts were open between floors. Air ducts carried heat and fresh air and elevators were open. Windows and openings were allowed on property lines. We know today that these conditions contribute to the spread of fire throughout a building. The single exit from the upper stories has been a big deterrent to reusing many buildings. But, these features made buildings livable in that age.

The second important difference between new and older buildings has to do with the building codes in effect when the buildings were constructed. The surge of people moving to the suburbs began after World War II. There were many young families looking for housing, America was in love with the automobile and gasoline was inexpensive. Almost, all significant buildings in the suburbs have been constructed since 1950. The BOCA, ICBO, the Life Safety Code and the Southern Codes have been the predominant building codes. These codes have a common philosophy in that they regulate the fire resistivity of the building material and the fire area. They require more than one exit from floors, require fire rated corridors, and fire rated doors. This is the same code philosophy as the International Building Code. Building codes in effect prior to the development of the BOCA codes did not address the inherent fire resistivity of building materials; they addressed fire resistivity by requiring masonry exterior walls. Masonry was

fire proof. These codes allowed features such as open stairways and one exit from upper floors. Fire escapes were required for a secondary means of exiting the upper floors of a building.

The buildings do not have the comfort standards that people demand today. People need air conditioning, more electricity and more plumbing today.

## Common Terms

The building code uses the following terms when it addresses existing buildings. It is appropriate to list their meanings. The terms used in the building code are:

- 1) *Repair*- “fixing stuff” repair of existing faucets, outlets
- 2) *Renovation*- removal and replacement, introducing a new product
- 3) *Alteration*-reconfiguring space, installing something there that was not there before
- 4) *Reconstruction*- Occupancy specific approach – “gut rehab”, new products and practices, new materials & methods, new building elements, basic and supplemental requirements
- 5) *Addition*

## CHAPTER II “REHAB” TOOLS AVAILABLE IN THE VUSBC

The tools for rehabilitating buildings are present in the code. People need to be acquainted with their location and how to use them.

### Code of Virginia

#### 36-99.01 Provisions related to rehabilitation of existing buildings

Urgent need to improve the housing conditions of low and moderate income and families

There are large numbers of older residential buildings in the commonwealth with are in urgent need of rehabilitation and must be rehabilitated

The application of those building code requirements currently in force to housing rehabilitation has sometimes led to the imposition of costly and time-consuming requirements that result in a significant reduction in the amount of rehabilitation activity taking place.

#### **36-103 Buildings, etc., existing or projected before effective date of the code.**

Buildings constructed shall remain subject to the building regulations in effect at the time of issuance of the building permit or commencement of construction. Subsequent reconstruction, renovation, repair or demolition of such buildings or structures shall be subject to the pertinent construction and rehabilitation provisions of the building code.

### Administrative Amendments adopted by the State Board of Housing and Community Development (Effective October 1, 2003)

#### **Article 1. ADMINISTRATION**

109.2 Modifications. The building official may grant modification to any of the provisions of the USBC provided the spirit and intent of the USBC are observed and the public health, welfare and safety are assured

111.6 Change in Occupancy. The building can be required to meet current standards of structural strength, fire protection, means of egress, ventilation or sanitary provisions for the new occupancy. Modifications shall be issued, upon application, when it is impractical to achieve full compliance.

111.6.1 Reconstruction, alteration or repair. Work shall be done in such a way so as not to lower existing levels of health and safety

## **Article 2. REHABILITATION**

112.4 Reconstruction, alteration or repair. The safety of the building must be equal to or greater than the safety of the building before the work started

122.5 Additions. Additions to any structure shall conform to the requirements of this code for new construction. Additions shall not be made that will cause the existing structure to become unsafe.

## **Article 3. RETROFITTING**

These provisions relate to installing fire protection equipment and systems in motels, hotels, hospitals, daycare facilities, dormitories, nursing homes and multi family dwellings along with identification of disabled parking spaces.

### **International Building Code/ 2000**

#### **Chapter 34 EXISTING STRUCTURES**

This chapter provides an alternate method for determining what to do with an existing building to make it code compliant.

Easier because the sprinkler provisions

Can be used in all use groups except high hazard and institutional

### **3404 Glass Replacement**

3406.1 Historic buildings. The provisions of this code are not mandatory for historic buildings where such buildings are judged by the building official to not constitute a distinct life safety hazard.

### **3408 Accessibility**

719 PERSCRIPTIVE FIRE RESISTANCE

## CHAPTER III      APPLICATIONS

### Philosophy and policies

1. The building must be safer after rehabilitation than it was before the work started
2. There is nothing inherently wrong with the materials used in building construction prior to 1950
3. All of the archaic building materials have a certain degree of fire resistivity
4. Place more reliance on active fire protection and less on passive fire protection
5. No arbitrary dimensional requirements – stair widths, corridor widths, height limitations and area limitations
6. No arbitrary upgrading of systems – if a building has a certificate of occupancy for a use and occupancy, the building commissioner's office will honor the certificate for the use and occupancy
7. Utilize performance requirements in codes – evacuation times
8. Vacant buildings are addressed according to the appropriate regulations for the number of floors occupied.

### Changes in types of construction & use groups

The International Building Code is organized very much like the BOCA National Building Code/1996 edition. This means that the document is very easy to use if one is familiar with the BOCA format.

The types of construction have been adjusted somewhat. For instance, type 2 C construction is now type IIB construction.

Material	BOCA National Building Code /1996	International Building Code/ 2000
Non Combustible Protected	1A	IA – Structural Frame, bearing walls, floors and roof constructed of non combustible materials
Non Combustible Protected	1B	IB – Structural Frame, bearing walls, floors and roof constructed of non combustible materials
Non Combustible Protected	2A	IIA- Structural Frame, bearing walls, floors and roof constructed of non combustible materials
Non Combustible Protected	2B	
Non Combustible Unprotected	2C	IIB- Structural Frame, bearing walls, floors and roof constructed of non combustible materials
Non Combustible Protected	3A	IIIA- Exterior walls are non combustible materials and the interior walls are of any material allowed by the code
Non Combustible Unprotected	3B	IIIB- Exterior walls are non combustible materials and the interior elements are of any material allowed by the code
Non Combustible Unprotected	4	IV- Exterior walls are non-combustible materials and the interior elements are of laminated or solid wood.
Combustible Protected	5A	VA - Structural elements, exterior and interior walls are of any materials allowed by the code.
Combustible Unprotected	5B	VB – Structural elements, exterior and interior walls are of any materials allowed by the code.

Comparison of types of construction



The building use groups have been adjusted slightly. For instance restaurants, which were, which were formerly "A 3" are now in an A2 use group with nightclubs. Institutional use groups have been changed.

TABLE 2: COMPARISON OF USE GROUPS

	BOCA National Building Code /1996	International Building Code/ 2000
Assembly	A-1	A-1
	A-2	A-2 (Restaurants)
	A-3	A-3
	A-4	A-4
	A-5	A-5
Business	B	B
Educational	E	E
Factory	F-1	F-1
	F-2	F-2
High Hazard	H-1, H-2, H-3, H-4	H-1, H-2,H-3, H-4, H-5
Institutional	I-1	I-1
	I-2	I-2
	I-3	I-3
		I-4 (Day Care Facilities)
Mercantile	M	M
Residential	R-1	R-1
	R-2	R-2
	R-3	R-3
	R-4	R-4
Storage	S-1	S-1
	S-2	S-2
Utility	U	U

### Comparison of Use Groups

The provisions of the building code that were formerly in Chapter 34 of the BOCA code are now in IBC Chapter 34 "Existing Structures". Some of these provisions include:

- Portions of the structure not altered and not affected by the alteration are not required to comply with the code requirements for a new structure.  
EXCEPT IN FLOOD ZONES
- Handicapped parking spaces- requirements for signing
- Glass replacement required where safety glass is required
- Permit required with a change of occupancy- Change of occupancy – increased seating in restaurant or nightclub, increase of the fire hazard for of contents in a warehouse, increase in the structural load etc.

## Chapter 34 Analysis

### Elements

There are two ways to determine whether existing buildings can be brought into compliance with the Virginia Uniform Statewide Building Code.

They are:

1. Design according to the provisions of the code- this is the same procedure that is used to design a building. It probably is the best procedure to use with one story and small buildings.
2. Analyze and design according to “Chapter 34” of the code

The “Chapter 34” method is a different way of determining whether a building satisfies the International Code. It was specifically developed for existing buildings because many of the elements of existing buildings are salvageable. The evaluator must investigate eighteen (18) important elements of the existing building and assign “point values” to the various elements. The sum of the point values determines whether the building complies with the code. If the points accumulated exceeds the minimum required for fire safety, general safety and means of egress safety it is deemed to comply with the code. A positive point value means that the building is “safe”. A negative point value does not.

Either way is acceptable with an existing building.

There are two key provisions for the Chapter 34 analysis method. “Chapter 34” analysis requires the owner’s permission and it is not suitable for “H” High Hazard and “I” Institutional uses.

Institutional uses include the following:

I – 1 is a building housing more than sixteen (16) people who must live in a supervised residential environment that provides personal care services. This includes group homes, halfway houses

I – 2 is a building housing used for medical, surgical, psychiatric, nursing or custodial care on a 24 hour basis for more than five (5) persons who are not capable of self preservation.

I – 3 is a building housing more than five (5) people who are under restraint or security.

I – 4 is a building housing more than five (5) people who require care on less than a 24-hour basis. This includes adult day care and infant day care. Notice the exception for infants in buildings where the exits lead directly to the outside. This situation puts the building into the “E” educational use group

The Building Commissioner’s office in the City of Richmond has found that the “Chapter 34” method is a good tool for large buildings; but it is somewhat limited on small buildings, such as where a two-story wood frame dwelling is being converted to a real estate office.

Here is a table that illustrates the critical elements of the building that must be evaluated:

Building Feature	Fire Safety	Means of Egress Safety	General Safety
1. Building height - Increases are allowed for automatic sprinkler systems			
2. Building area- Increases are allowed for automatic sprinkler systems and for open perimeter.			
3. Compartmentation			
4. Tenant and dwelling unit separations			
5. Corridor walls			
6. Vertical openings			
7. HVAC systems			
8. Automatic fire detection			
9. Fire alarm system			
10. Smoke control	*****		
11. Means of egress capacity and number	*****		
12. Dead ends	*****		
13. Maximum exit access travel distance	*****		
14. Elevator control			
15. Means of egress lighting	*****		
16. Mixed occupancy		*****	
17. Automatic sprinklers		/2	
18. Incidental use			
Building Score- This is the sum of the values in the appropriate column			
Minimum Score is based on the use proposed for the building			
Difference			

### Typical examples

#### Example #1

Address:	(Client has asked that this remain confidential)
Type of construction=:	IV
Current use =	S (Warehouse)
Proposed use =	“B” Business group (artist studios) – check on the print shop could this be a “B”
Building configuration =	2 floors – Floor Area = 21, 615 Sq. Ft.
Code that will be used	ICC Chapter 34 with Specific Supplements from the 2001 supplement
Flood Hazard Zone	None
Open Perimeter=	The building is open on three sides. The exterior lengths of the three open sides are 161 ft., 131 ft. and 161 ft.
Sprinkled=	None
Proposed Occupant Load=	200 people – 100 people on each floor.

Section	Issue		Category	Points
3409.6.1	Building Height			2.4
AH = 65 ft. from Table 503 EBH= 35 ft. AS= 5 Stories from Table 503 EBS= 2 stories CF= AH-EBH = 65'-35', it is + so CF=1 $AH-EBH/12.5 = 65-35/12.5 = 2.4$				
3409.6.2	Building Area			12
Open perimeter = $l = 100[161+131+161/161+131+161+131-0.5] = 100[453/584-0.25]$ $= 100[.78-.25]=153\%$ Sprinklers = none – client does not desire this and space is not sprinkled Area from Table 503 = 36,000 sq. ft AA = 153% 36,000 = 54,925 sq. ft. Actual area = 21,091 sq. ft. Area value = $54,925/1200 [1-(21,091/54,925)] = 45.77[1-.38] = 28.19$ Check – Mandatory Fire Safety Score is: 24, $28.19 > (50\%) * 24$ so Area value is 12				

Section	Issue		Category	Points
3409.6.3	Compartmentation		b	4
Divide each floor into compartments with a 2 hr. fire rating and an area less than 10,000 square feet.				
3409.6.4	Tenant Separation		b	-3
Assume no tenant or dwelling unit separations. The client wants to preserve the open floor space. Floor has less than a one hour fire rating				
3409.6.5	Corridor Walls		a	-5
Two remote exits will be constructed serving the floor. These will be enclosed in a 1-hour fire rating. There will be no rating in the corridors between the artist's studios.				
3409.6.6	Vertical Openings			2.3
<p>For fire safety purposes – close the opening between the rear of the elevator shaft and the existing stairway from the second floor. This wall should be 4" masonry block similar to the existing and this will provide a two (2) hour rating. Close the fire door to the stairway and use this space for the electrical panel and switchgear.</p> <p>There are two existing industrial elevators in the building. The elevators are not in operational condition and will not be used for freight or passengers. These elevators have historical significance. The fire doors are intact. Assume the elevator doors will be open on the first floor, but the fire doors will be closed on the second floor. The elevator shaft is masonry and has a two (2) hour rating. Assume the doors have less than a 2-hour rating because the closure is not complete so use 1 hour.  PV= 1  CF= 2.3 So VO = 1* 2.3= 2.3</p>				
3409.6.7	HVAC systems		e	+5
Install HVAC systems that only serve one story				
3409.6.8	Automatic Fire Detection		e	+8
Install smoke detectors throughout the entire fire area				
3409.6.9	Fire Alarm System		c	0
Install fire alarm system in accordance with 907 – manual pull stations, visible and audible alarms, and automatic fire detectors connected to buildings fire alarm control panel & monitoring (907.7,907.10)				



Section	Issue		Category	Points
3409.6.10	Smoke Control		a	0
No smoke control				
3409.6.11	Means of Egress Capacity & Number		e	0
Two remote exits will be constructed from the second floor to the outside. The exits from the first floor will also go to the outside. Locate the exits in the opposite corners of the building. Make the width of the stairs wide enough so the exit capacity exceeds 125% of the required exit capacity. Two stairs 44" wide / .3" per occupant = 146 occupant so 88" of stairway capacity = 293 occupants.				
3409.6.12	Dead Ends		c	2
No dead ends and the ratio of length to width is <2.5 to 1. The actual ratio is 161/131= 1.23 to 1				
3409.6.13	Minimum Travel Distance to an exit			0
The width (131') and the length (161') give a diagonal distance of 208'. This makes it likely that the maximum exit access travel distance of 200 feet will be met. So $20[(200 - 200) / 200] = 0$				
3409.6.14	Elevator Control		a	-2
Assume no elevator. The elevators will not be operational				
3409.6.15	Means of Egress Lighting		c	4
A back up generator is being installed to provide means of egress lighting in the event of power failure to the site or to the building				
3409.6.16	Mixed Occupancy		b	0
There are no mixed occupancies. All of the occupancies are in the same use groups.				
3409.6.17	Sprinkler		c	0
Sprinklers are not required and are not provided. Examine sprinkler requirements for storage areas.				
3409.6.18	Incidental Use			0
There are no incidental uses (assembly areas?)				

### EXAMPLE PROBLEM

Feature	Fire Safety	Means of Egress Safety	General Safety
Building height	2.4	2.4	2.4
Building area	12	12	12
Compartmentation	4	4	4
Tenant and dwelling unit separations	-3	-3	-3
Corridor walls	-5	-5	-5
Vertical openings	2.3	2.3	2.3
HVAC systems	5	5	5
Automatic fire detection	8	8	8
Fire alarm system	0	0	0
Smoke control	*****	0	0
Means of egress capacity and number	*****	0	0
Dead Ends	*****	2	2
Minimum travel distance to an exit	*****	0	0
Elevator control	-2	-2	-2
Means of egress lighting	*****	4	4
Mixed occupancy	0	*****	0
Sprinkler	0	0	0
Incidental use	0	0	0
Total Building Score	23.7	29.7	29.7
Minimum Safety Score	24	34	34
Trial Difference	-0.3	-4.3	-4.3
Increasing fire resistance rating of exits from 1 hour to 2 hours with doors will increase corridor wall value (3409.6.5) by 5 points	5	5	5
<b>Difference ( Considered to be 'safe" if "+" in all categories)</b>	<b>4.7</b>	<b>0.7</b>	<b>0.7</b>

**BUILDING CAN BE RENOVATED FOR THE PROPOSED USE**

### Construction Notes:

- The elevator shaft should be totally enclosed at the rear of the existing stairwell.
- Two exit stairways should be constructed in the diagonal corners of the building. Two exits are needed from the second floor and two exits are needed from the first floor. The exit stairs must be enclosed in a two-hour fire rated compartment. The exit doors must be rated for two hours and be equipped with panic hardware. The exits must go all the way to a public area. The stairs may be constructed of wood. An encroachment permit will be required for the stairway in the rear of the building on the exterior of the building. This portion of the exit stair will have to be made of concrete.
- Each floor of the building will have to be divided into compartments with less than 10,000 square feet of floor area in each compartment. The compartments will have to have 2 hr. fire rated walls and doors with a 2 hr. fire rating. The walls will have to go from the floor to the ceiling. Given the fact that the floor area of each floor is
- The building must be equipped with automatic smoke detectors and a manual alarm system with pull stations within 5 feet of the exit doors. The alarms must be both visible and audible. The control panel must be marked with the zones. Central station monitoring is required.
- The emergency lighting must be powered with a backup electrical generator. The generator may be powered by natural gas.
- Toilet rooms will be required for males and females on the first floor. At least one of each sex must be accessible. The ratio is 1:25 people. This means that 4 fixtures will have to be provided for females and 4 for males. Two sinks will be required for each sex also.
- A janitorial sink will be required.
- Check with the utilities department whether a backflow prevention valve will be required on the water supply line.
- Accessible drinking fountains will be required.
- The existing electrical panels may remain in the stairway from the first to the second floor.
- All storage areas over 100 sq. ft. in floor area must be enclosed in a 2-hour fire rated wall. The existing refrigeration compartment appears to meet this requirement if it is equipped with proper fire doors.

- The HVAC system will have to serve one floor. Separate systems will be required for each floor.
- Class 1 standpipes will be required in the exit stairwells because the floor area exceeds 10,000 sq. ft. and the interior has spaces more than 200 feet from the nearest fire department access.
- Check to determine whether this is located in a flood zone or in a Chesapeake Bay Preservation Zone.
- Engineered plans will be required for building, electrical, HVAC and plumbing plans.

## Example # 2

Address:	1200 Westover Hills Blvd.
Type of construction=	IIB
Former Use =	B – US Post Office
Proposed use =	A2 – American Legion Hall – they also want parties, receptions that combine dining, dancing and alcoholic beverages
Building configuration	1 floors – Floor Area = 5,000 Sq. Ft.
Code that will be used from the 2001 supplement	ICC Chapter 34 with Specific Supplements
Flood Hazard Zone	None
Open Perimeter=	Do not include
Sprinkled =	None
Proposed Occupant Load =	200 people

Section	Issue		Category	Points
3409.6.1	Building Height			3.1
AH= 55 ft. from Table 503 EBH= 16 ft. AS= 2 Stories from Table 503 EBS= 1 story CF= AH-EBH = 55'-16' , it is + so CF=1 AH-EBH/12.5 = 55-16/12.5 = 3.1				
3409.6.2	Building Area			3.7
Sprinklers = none – client does not desire this and space is not sprinkled Area from Table 503 = 9,500 sq. ft Actual area = 5,000 sq. ft. Area value = $9,500/1200 [1-5,000/9,500]} = 7.92[1-.53] = 3.07$ Check – Mandatory Fire Safety Score is: 19, $3.7 < (50\%) * 19$ so Area value is 3.7				
Section	Issue		Category	Points
3409.6.3	Compartmentation		d	14
There is one fire area from Table 3409.6.3 use category a				
3409.6.4	Tenant Separation		d	1
Assume no tenant or dwelling unit separations. The client wants to preserve the open floor space. Floor has a one hour fire rating				
3409.6.5	Corridor Walls		c	0
Two remote exits will be constructed serving the floor. These will be enclosed in a 1-hour fire rating. The front and rear exits will be upgraded with fire rated exit doors with panic hardware.				
3409.6.6	Vertical Openings			2
This is a one story building so the value is 2				
3409.6.7	HVAC systems		e	+5
Install HVAC systems that only serve one story				
3409.6.8	Automatic Fire Detection		e	0
No smoke detectors				
3409.6.9	Fire Alarm System		c	0
Install fire alarm system in accordance with 907 – manual pull stations, visible and audible alarms				

Section	Issue		Category	Points
3409.6.10	Smoke Control		a	0
No smoke control				
3409.6.11	Means of Egress Capacity & Number		e	0
Two remote exits will be constructed. The exits from the first floor will go to the outside. Locate the exits in the front and rear corners of the building.				
3409.6.12	Dead Ends		b	0
No dead ends and the ratio of length to width is >2.5 to 1				
3409.6.13	Minimum Travel Distance to an exit			15
The width (50') and the length (100'). This makes it likely that the maximum exit access travel distance of 50 feet will be met. $20[(200-50)/200]=$				
3409.6.14	Elevator Control		a	0
No elevator.				
3409.6.15	Means of Egress Lighting		b	0
3409.6.16	Mixed Occupancy			0
There are no mixed occupancies. All of the occupancies are in the same use groups.				
3409.6.17	Sprinkler		c	0
Sprinklers are not required and are not provided. The actual area is slightly less than 5,000 square feet.				
3409.6.18	Incidental Use			0

## "Chapter 34" Analysis

**Address** Westover Blvd.

**Issue:** Can a former post office be converted to an American Legion Hall?

**Type of Construction** = II B

**Floor Area** = 5000 Sq. FT.

**Proposed use** = American Legion Hall = A2

Section	Feature	Fire Safety	Means of Egress Safety	General Safety
3409.6.1	Building height	3.12	3.12	3.12
3409.6.2	Building area	3.72	3.72	3.72
3409.6.3	Compartmentation	14	14	14
3409.6.4	Tenant and dwelling unit separations	0	0	0
3409.6.5	Corridor walls	0	0	0
3409.6.6	Vertical openings	2	2	2
3409.6.7	HVAC systems	5	5	5
3409.6.8	Automatic fire detection	0	0	0
3409.6.9	Fire alarm system	0	0	0
3409.6.10	Sprinkler	*****	0	0
3409.6.11	Means of egress capacity and number	*****	0	0
3409.6.12	Dead Ends	*****	0	0
3409.6.13	Minimum travel distance to an exit	*****	15	15
3409.6.14	Elevator control	0	0	0
3409.6.15	Means of egress lighting	*****	0	0
3409.6.16	Mixed occupancy	0	*****	0
3409.6.17	Sprinkler	0	0	0
3409.6.18	Incidental use		0	0
	<b>Total Building Score</b>	27.84	42.84	42.84
	<b>Minimum Safety Score</b>	19	30	30
	<b>Difference</b>	8.84	12.84	12.84

All values are positive so the building will comply.



## PERSCRIPTIVE FIRE RESISTANCE

Today, the fire resistivity of buildings is commonly determined by testing the building materials in furnaces. Standard fire tests have been developed and manufacturers pay the expense of testing the fire endurance of their materials. Information is readily available for concrete, steel & gypsum materials.

Manufactures do the required testing to secure a market for their materials. The use of standardized fire resistivity tests was not the case before 1950. The fire endurance of building materials was not determined prior to 1950. The manufacturers of building materials used today do not want to pay the expense of testing these archaic building materials because they will not recover this expense. The reason is pure economics. There is not enough of a market for the archaic building materials to support the cost of testing.

Archaic building materials left the market place because other materials were less expensive and easier to install. The reasons were better economics and better technology. The classic example is plaster. It was replaced by dry wall because dry wall could be installed with less expense and in less time. Therefore lath and plaster left the scene. However, these materials do have some fire rating. These materials, such as heavy wood columns and lath/plaster, resist the effects of flame and heat for a period of time before they fail. This interval provides time to warn the occupants and time to evacuate the building. However, some Building Officials take the position that these materials do not have any fire endurance because they have not been tested according to nationally recognized criteria.

The International Building Code (ICC) has partially addressed this problem. Therefore, it has an advantage over the BOCA National Building Code/1996. The ICC incorporates "Prescriptive Fire Resistance" ratings in Section 719. The information in this section can be used to determine the fire ratings of building materials. Also, the National Institute of Building Sciences has determined the fire rating for archaic building materials. This information and additional information regarding the fire rating for archaic building materials is available in the booklet Guidelines for Rehabilitating Existing Buildings. This information can be used to answer the question about the fire rating of archaic building materials.

The ICC groups the fire ratings for these materials by the following building elements:

- I. Walls- Table 719.1(2) lists the fire ratings for various walls and partitions. The walls are grouped by the type of material. Information is available for brick walls, concrete walls etc. For example: the fire rating for a brick wall that is 3.8" thick is two (2) hours (Item number 1-1.1) and the fire rating

for a interior partition constructed with wood studs with plaster on each side that is 5 1/8" thick is one (1) hour (Item number 12-1.2).

- II. Columns – Table 719.1(1) lists the fire ratings of columns with various covers over them. Values are included for steel columns, prestressed concrete and reinforced concrete members. The table does not include values for wood columns. However, additional fire resistance information for wood columns is available in the Guidelines for Rehabilitating Existing Buildings
- III. Floor/Ceiling Assemblies- Table 719.1(3) lists the fire ratings of floor/ceiling assemblies. Information for wood floors is listed in item number 13 and 14. Additional fire resistance information for wood floor/ceiling assemblies is available in the Guidelines for Rehabilitating Existing Buildings
- IV. Beams - Table 719.1(1) lists the fire ratings of beams with various covers over them. Values are included for steel columns, prestressed concrete and reinforced concrete members. The table does not include values for wood beams. However, fire resistance information for wood columns is available in the Guidelines for Rehabilitating Existing Buildings
- V. Doors- The tables in the ICC do not include fire resistance information for wood door. But, the fire resistance information for the doors is essential for determining whether a wood/plaster wall in good construction has the required one (1) hour fire rating. Fire resistance information for wood doors is available in the Guidelines for Rehabilitating Existing Buildings in section V. A panel door with panels 3/8" thick (Item Code D-1) is five (5) minutes. The fire exposure rating of a panel door with panels 3/8" thick and two coats of U.L. listed intumescent fire retardant paint (Item Code D-2) is five (5) minutes. The fire exposure of a solid oak door (Item Code D-24) that is 1- 7/8" thick is 35 minutes.

This information can be used in a Chapter 34 analysis to determine whether a hallway, corridor or other building element has sufficient fire resistivity to comply with the USBC.

## ACCESSIBILITY

Existing buildings that undergo a change of use group or occupancy shall have all of the following features:

1. At least one accessible entrance. This is maybe difficult to achieve in the City because the public sidewalk and the City right of way is at the front face of the ability. Private work cannot encroach on the public right of way without a permit from the Department of Public Works. Also encroachment permits are required for exit doors that swing into the public right of way.
2. At least one accessible route from an accessible entrance to primary function areas
3. Signage complying with the USBC (See standards on p. 16 of the "PROPOSED REGULATIONS")
4. Accessible parking where parking is provided. Parking is not required in the downtown area of the City of Richmond.
5. At lease one accessible passenger-loading zone where loading zones are provided.
6. At least one accessible route connection accessible parking and accessible passenger loading zones to an accessible entrance.

Alterations affecting an area containing a primary function are affected by the 20% rule. The amount of work needed to make the area accessible is limited to 20% of the value of the entire project.

The accessibility requirements in the code are limited to certain project. The do not apply if the project only

- involves windows, hardware, electrical outlets and signs
- Is limited to alterations of HVAC systems, electrical systems, fire protection systems or abatement of hazardous materials.

The alteration of buildings or components of the building for accessibility is not required if the work is "technically infeasible". This is the case, where doorsteps in the urban areas consist of granite curbs or buildings are not set back from the property lines. Some businesses use portable ramps that can be put over the doorstep if the situation arises.

Ramps may be steeper than 1: 12 in certain situations. This may be the case where the building is situated so close to the property line that a ramp cannot be properly constructed.

The Building Commissioner's office has three (3) priorities for applying the accessibility provisions of the code.

1. Accessible entrances

- 1.1.1. In the rear- the entrance may be put in the rear using an alley if an entrance cannot be placed at the front due to technical feasibility or historical reasons.

- 1.1.2. Threshold –the ICC limits the height of a threshold to  $\frac{3}{4}$ "

- 1.1.3. Parking spaces and paths of travel

2. Accessible routes

- 2.1.1. Elevators- these are often infeasible

3. Accessible restrooms

- 3.1.1. Unisex restrooms are allowed if it is technically infeasible to install a restroom for each sex

- 3.1.2. Accessible drinking fountains

There are situations in the City where it is technically infeasible to install any accessibility features. In the situations, businesses are advised to install features to "bring service to the people". This includes installation of special doorbells for people requiring special assistance.

## HISTORICAL PROVISIONS

Section 3406- “The provisions of the code relating to construction, repair, alteration, addition, restoration, movement, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the building official to not constitute a distinct life safety hazard.”

There are three (3) types of historic buildings

1. Historic Buildings – These are buildings listed on a historical register. Examples in the City of Richmond include the Old Armory on Leigh Street, the Maggie Walker House, and the Jefferson Hotel.
2. Old and Historic Districts – The provisions for historic buildings can be construed to include structures in “Old and Historic Districts”. These buildings may not be historic but all buildings in the neighborhood contribute to the historic character of the area. There are several Old and Historic Districts in the City of Richmond. Development projects in these districts are evaluation by the City’s Commission on Architectural Review (CAR). There are building renovation projects that are considered as ordinary repairs by the USBC that must be evaluated by the CAR. Examples of such areas in the City of Richmond include: Church Hill, Shockoe Slip, and Jackson Ward. The exterior façade of buildings is considered historic and architectural integrity must be maintained. However, changes that are not visible from the street can be made without regard to historical integrity. A good example of such a situation is the building that houses the “In your ear” recording studio. The “new “ construction must conform with the International Building Code /2000
3. Historic Tax Credits – Many projects in the City of Richmond involve historic tax credits. Certain elements of these buildings are historic and must be preserved. Examples of such projects include: The condominium conversion of the Laurel Hill Nurses Dormitory at Stuart Circle Hospital, The Lofts at Lee School, the Coliseum Lofts and the Tobacco Row Development.

Demolition is not an option in historic districts. Demolition is only allowed when approved by the CAR or for safety reasons when structural collapse of the building is imminent.

## ADMINISTRATIVE MODIFICATIONS

Administrative modifications are important tools for reusing existing buildings. They provide the flexibility needed to make the project viable for reasons that include the historical impact and technical feasibility.

Authority for these is listed in the proposed regulations.

### Section 109.2          Modifications

Building official may grant a modification to any provisions of the USBC provided the spirit and intent of the USBC are observed and public health, welfare and safety are assured.

Building official may

- require engineering details and supporting data
- consider a statement from an professional engineer, architect or other competent person as to the equivalency of the proposed modification

All modifications must be in writing and shall be filed with the Certificate of Occupancy in the records of the building department. The City of Richmond has a specific document it uses for this purpose. An example is found in the appendix.

The key question for considering a request for a modification is:

“What increased fire and life safety provision will be provided to compensate for the lack of the mandated item?”

Frequently, there are fire and life safety provisions that can be increased or added to provide alarm, additional evacuation time etc. Examples of typical modifications given for specific projects in the City of Richmond are listed in the Appendix.

## CHAPTER IV SUMMARY OF THE PROCEDURE –“10 STEP” PROCESS

Procedure	Comments
1. Investigate building history	Obtain copies of previous Certificates of Occupancy and other documents relating to previous uses in the building.
2. Environmental inspection	<p>PROPOSED REGULATIONS - 13 VAC 5-62-120 Section 112.0 Permits -112.4 an asbestos inspection is required if the building was constructed prior to January 1, 1985. This must be done by a qualified asbestos inspector.</p> <p>An inspection for lead base paint must be conducted prior to doing the work if the work involves federal funds. This may be the case with dwelling units, schools and/or day care centers.</p> <p>Determine whether the building is a “flood zone”.</p>
3. Structural analysis	Inspect and evaluate the structural condition of the building. Determine whether the building will accommodate and anticipated structural forces. Determine whether any structural repairs are needed. Determine whether any live load reductions will be needed according to section 3402 of the ICC.
4. Analysis of stairways, exits and open perimeter of the building.	A field inspection will be needed to gather this information.
5. Analysis for height and area	This information can be obtained from a field inspection, the City Assessor’s information and from the ICC Table 503.

6. Analysis for fire safety, means of egress safety & general safety	Perform the calculations according to Chapter 34 of the ICC
7. Accommodate historical requirements	Determine whether the proposed project is governed by historical preservation regulations.
8. Design accessibility	<p>Determine what features must be included in the design for making the building accessible:</p> <ul style="list-style-type: none"> <li>a. Accessible parking</li> <li>b. Accessible path of travel to the building</li> <li>c. Accessible entrance</li> <li>d. Accessible route throughout the building</li> <li>e. Accessible restrooms</li> </ul>
9. Determine where modifications will be required	Determine whether any administrative modifications will be required and determine what supporting evidence is needed to demonstrate that the modification will preserve the spirit and intent of the USBC.
10. Prepare "application package"	<p>Prepare the Application for a Permit &amp; the plans for submission to the Bureau of Permits and Inspections in room 110 of City Hall.</p> <p>Please remember to include structural information, locations where safety glass is needed and results of the environmental information.</p>



# **APPENDIX**

- A. City of Richmond form for Building Code Modifications
- B. Typical Problems and Suggested Solutions
- C. Examples of administrative modifications granted by the City of Richmond for buildings based on the BOCA National Building Code
- D. Chapter 34 analysis prepared by Mark Freeman AIA of Freeman, Solt, PLLC.

Appendix A: City of Richmond form for Building Code Modifications

**REQUEST FOR BUILDING CODE  
MODIFICATION UNDER SECTION  
103.2 OF THE VIRGINIA UNIFORM  
STATEWIDE BUILDING CODE**



**CODE MODIFICATION REQUEST**

CITY OF RICHMOND, VIRGINIA  
DEPARTMENT OF COMMUNITY DEVELOPMENT  
BUREAU OF PERMITS AND INSPECTIONS  
P. O. BOX 26505  
ROOM 110 CITY HALL  
RICHMOND, VIRGINIA 23261

JOB LOCATION	FLOOR NO./ ROOM NO.
OWNER'S NAME	
ARCHITECT'S NAME	
OWNER'S SIGNATURE	ARCHITECT'S SIGNATURE

NEW STRUCTURE <input type="checkbox"/>	EXISTING STRUCTURE <input type="checkbox"/>	ADDITION <input type="checkbox"/>	CURRENT USE CHOOSE FROM BELOW	PROPOSED USE CHOOSE FROM BELOW	NO. OF UNITS
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>A-1 -A THEATRE WITH STAGE</b> A-1-13 THEATRE WITHOUT STAGE A12 NIGHTCLUB, DANCE HALL A-3 -A RESTAURANT A-3-B MUSEUM, ART GALLERY A-3-C LIBRARY, EXHIBITS A-3-1) PASSENGER TERMINAL A-3-E RECREATION CENTER A-3-F LECTURE HALL A-4 CHURCH A-5 OUTDOOR ASSEMBLY B BUSINESS</p> </div> <div style="width: 45%;"> <p><b>E EDUCATIONAL</b> F-1 FACTORY, MODERATE HAZARD F-2 FACTORY. LOW HAZARD H HIGH HAZARD 1-1 GROUP HOMES, 6 OR MORE 1-2-A INSTITUTIONAL. INCAPACITATED 1-2-8 INSTITUTIONAL, DAY NURSERIES 1-3 INSTITUTIONAL, RESTRAINED <b>M RETAIL</b> A-1 HOTEL A-2-A DORMITORIES P-2-5 MULTIFAMILY</p> </div> <div style="width: 45%; text-align: center;"> <p><b>VIRGINIA UNIFORM STATEWIDE BUILDING CODE USE GROUP</b></p> </div> <div style="width: 45%;"> <p>P-3 I &amp; 2 FAMILY P-4 I &amp; 2 FAMILY DETACHED 5-1 STORAGE. MODERATE HAZARD 5-2 STORAGE. LOW HAZARD U TEMPORARY. MISCELLANEOUS</p> </div> </div>					
DATE OF REQUEST _____					

CODE SECTIONS FOR WHICH A MODIFICATION IS REQUESTED:
CODE FOR WHICH MODIFICATION IS REQUESTED: _____ EDITION OF CODE _____
REASON A MODIFICATION IS REQUESTED:

**FOR OFFICE USE ONLY**

APPLICATION APPROVED BY:	APPLICATION DISAPPROVED BY:	DATE
REASON FOR DISAPPROVAL		
A COPY OF THIS MODIFICATION SHALL BE ATTACHED TO THE FINAL CERTIFICATE OF OCCUPANCY.		

[illegible]

ARCHITECT'S/ENGINEER'S SIGNATURE
ARCHITECT'S/ENGINEER'S NAME
ARCHITECT'S/ENGINEER'S ADDRESS
ARCHITECT'S/ENGINEER'S TELEPHONE NO.

**ARCHITECT'S/ENGINEER'S ADDRESS**

**ARCHITECT'S/ENGINEER'S SEAL**

Appendix B. Typical Problems and Suggested Solutions – Excerpted from the 1984 edition of the BOCA Property Maintenance Manual starting on page 79. They were designed to facilitate rehabilitation of residential buildings. These solutions are suggested for consideration of requests for a code modification. They were developed by the National Institute of Building Sciences based on research performed by Building Technology, Inc. They have been published in the ICC booklet Guidelines for Rehabilitation of Existing Buildings.

Problem	Suggested solution
<b>Excessive Height</b>	
1. Building has more height than allowed by the code.	Restrict use to the first floor and keep upper floors vacant -or- Install sprinkler system -or- Engineering analysis of evacuation times
<b>Lack of Fire Department Access</b>	
1. Building does not have frontage on a street or public way that is 30 feet wide	Increase fire resistivity of the building
<b>Number of Exits</b>	
1. Less exits are available than required	Consider the use of a fire escape, ladder that is normally not accepted by the building code as an exit.
2. One exit available in a building with three occupiable floors when two exits are required	A single exit could be accepted if each floor arrangement meets the special conditions for a single exit for two story buildings.  Existing doors, if substantial may remain if equipped with self-closing doors. Lesser doors must be protected on both sides by automatic sprinkler protection. These sprinklers may be connected to the domestic water supply and need not be equipped to sound the building alarm.
3. One exit available in a building over three stories	A code complying smoke proof tower or exterior stair could be accepted as the single stair*

Horizontal Exits	
1. The fire resistance of the wall or partition as determined is below that required by the code	Upgrade the wall or partition to meet code requirements See the “Guidelines on Fire Ratings of Archaic Materials and Assemblies”.
2. Fire resistance of the opening protection is below that required by the code.	One-hour doors may be accepted in a wall assembly having 2 hours fire resistance if protected on both sides by automatic sprinkler protection. The sprinklers may be connected to the domestic water supply and may not be connected to the building alarm.
3. The only exit from an area of refuge is another horizontal exit in violation of the code.	Accept such arrangement if the fire resistance of the walls or partitions separating the compartments and of the protection of all openings in the walls or partitions, fully complies with the code requirements.

Interior Stairs/Enclosures	
1. The fire resistance of the stair enclosure is below that required by the code	Upgrade the stair enclosure to meet code requirements See the "Guidelines on Fire Ratings of Archaic Materials and Assemblies".
2. The two hour enclosure is required and the unenclosed stair does not meet the applicable code exception for communicating floors	The stair may be enclosed at each story by construction having 1-hour fire resistance. Walls should extend through any concealed or void spaces to the underside of the floor or roof above.
3. 1-hour enclosure is required and an unenclosed stair does not meet the applicable code exceptions for the communicating floor.	The stair may be enclosed at each story by construction having a fire resistance of 45 minutes.
4. A 1 hour enclosure is required and the stairway is enclosed with wood lath and plaster construction	Accept the assembly as meeting the spirit and intent of the Code.
Exterior Exit Stairs	
1. The fire resistance of the opening protection is below that required by the code	The openings need not be protected if there is a minimum of two exterior stairs located as to provide remote means of egress from an exterior exit balcony.
2. The fire resistance of the opening protection is below that required and there is only a single exterior stair	<p>Upgrade the fire resistance of the opening to meet code requirements See the "Guidelines on Fire Ratings of Archaic Materials and Assemblies". Windows must be wired glass or equivalent.</p> <p>-or-</p> <p>Install local sprinklers over opening protection. Such sprinklers may be connected to the domestic water supply and need not sound an alarm upon activation.</p>

Fire escape stairs	
1. Fire resistance of the opening protection is below that required by the code	<p>Upgrade the fire resistance of the opening to meet code requirements See the “Guidelines on Fire Ratings of Archaic Materials and Assemblies”. Windows must be wired glass or equivalent.</p> <p>-or-</p> <p>Install local sprinklers over opening protection. Such sprinklers may be connected to the domestic water supply and need not sound an alarm upon activation</p>
Arrangement of exits	
1. The required exits are not remote from each other	<p>Separate the non remote exits by smoke barriers located as to establish distinct and separate smoke zones</p> <p>-or-</p> <p>Provide additional exits</p>
Travel distance	
1. Measured travel distance exceeds the maximum travel distance required by the code	<p>Six Alternatives:</p> <ol style="list-style-type: none"> <li>1. Install a smoke barrier with smoke actuated automatic closing door</li> <li>2. Install an automatic fire alarm system activated by heat detectors.</li> <li>3. Install a manual alarm system, not otherwise required by the code</li> <li>4. Install an automatic sprinkler system in the corridor</li> <li>5. Equip the automatic sprinkler system to sound an alarm</li> <li>6. Provide additional exits</li> </ol>



<b>Dead End Travel</b>	
Excessive length of dead end travel	Provide an additional exit to eliminate the dead end -or- Construct a physical partition limiting the path of dead end travel -or- Install an automatic sprinkler system in the buildings
<b>Corridors and exterior exit balconies (separation and fire resistance)</b>	
1. The fire resistance of the corridor enclosure is below that required by the code	Accept the existing corridor wall if it consists of wood lath and plaster in good condition Add additional layers of fire rated materials Equip the building with an automatic fire detection system. The alarm should notify all building occupants. Doors to apartments must be equipped with self-closing devices.
2. The fire resistance of corridor doors is lower than that required by the code	Protect the door by a local sprinkler, which will spray the door in case of a fire on the room side of the corridor door. Such a sprinkler may be connected to the domestic water supply and need not sound an alarm upon activation. Door must be equipped with self closing devices  -or-  Upgrade the door to meet code requirements See the "Guidelines on Fire Ratings of Archaic Materials and Assemblies".
3. The corridor walls have openings other than doors which are inadequately protected as required by the code	All transoms should be closed with plasterboard, fixed wired glass or other materials. Other openings should be improved by adding layers of fire rated material.

Exit capacity/widths	
1. The width of an existing stair element or a new exit element constrained by structural or architectural features of the building is less than specified in the code	Accept the stair if it is wide enough to provide required exit capacity and is equal to or greater than 22 inches.
Construction details and specifications	
1. Existing winding and/or spiral stairs not permitted by the code	Allow their use if the occupants are generally, mobile, agile and capable of rapid movement under emergency condition- upgrade stairs in other respects particularly handrails and lighting.
2. Non conforming tread and riser dimensions	Accept stairs, which are steeper than those, permitted by the code. Upgrade lighting and handrails.
3. Ceiling height for stairs, passageways etc. are lower than the minimum specified in the code.	Allow the continued use if passable by the occupants, provided the ceiling height is not less than the minimum door height specified in the code.

Appendix C: Examples of administrative modifications granted by the City of Richmond for buildings based on the BOCA National Building Code

**Typical Examples of modifications for commercial buildings**

“P” = This statement is the description of the problem

“S” = This part contains the solution

1.     212 W. Broad Street                      Section 313.3                      5/22/00  
  
P: Converting the second and third floors to apartments in an existing building. The first floor historic ceiling lacked the proven one-hour fire rating.  
  
S: The structure will be sprinkled, therefore the modification was granted for one-hour fire separation minimum. First floor historic wood ceiling may have some fire-resistance rating.
2.     3308 N. Boulevard                      Section 1014.0                      7/22/99  
  
P: Seven (7”) maximum rise is required per the code on all stairs.  
  
S: Seven and one half (7 ½”) inch riser to be allowed in low occupancy area for automobile repair technicians on catwalk of new Express Lube. (Little chance of hazard in area where only able-bodied personnel can work).
3.     701 Bainbridge Street                      Section 3105                      2/22/00  
  
P: Spaghetti Warehouse. Canopy is required to be metal framework.  
  
S: Metal would compromise the historic tax credits. Fire-treated lumber was proposed by the architect and accepted.
4.     2053 W. Broad Street                      Section 904.10, 1014.11, 302.1.1  
            4/12/99  
  
P: Exiting restaurant with basement office and storage (windowless story).  
  
S: Proposed fire detection system installed to provide early warning in an existing restaurant with an existing office/storage and mechanical basement. Otherwise a fire suppression (sprinkler) system would have been required for the proposed continued use.

5.     1401 – 05 E. Cary Street     Section 404.2 International Plumbing Code  
          1995   6/13/00
- P: Mercantile space is provided with only one bathroom, which was acceptable in previous BOCA Plumbing Code 1993. The current International Plumbing Code requires two toilets (M/F).
- S: The tenant space has a low expected occupancy total. Occupant load was reduced to 40 people maximum (10 employees and 30 customers). Otherwise IPC 1995 allows only 15 persons.
6.     3437 W. Cary Street                     Section 1014.11  
          3/23/00
- P: Two story building with only one exit from the second floor. This exit must be fire rated as an interior stairway enclosure.
- S: Existing office building to be converted to retail (light-remodel). The applicant would encounter extensive alterations requiring 2<sup>nd</sup> floor exit stair to be fire-rated, therefore owner offered a limited area sprinkler coverage.
7.     2601-2603 E. Franklin Street             Section 503 BOCA 1993  
          6/2/00
- P: This is an existing R2 (multi-family) of 3B Construction; the prescribed limit is three stories. The existing structure is four stories already.
- S: Architect/Owner has volunteered to install a fire alarm system to increase the overall building safety, since the structure is not in compliance with the current code.
8.     501 S. 14<sup>th</sup> Street                     Section 1010.3 BOCA 1996  
          11/10/99
- P: Spaces of office use with one exit may not exceed a 75' travel distance. Travel distance out of utility room exceeds 75 feet.
- S: The only access to the area will be limited to special personnel. The room will remain locked and off limits to tenants and the general public.
9.     415 – 417 E. Grace Street     Section 1014.4 BOCA 1996                     1/5/98
- P: An 80" minimum clearance for headroom is required in an exit stair measured from the nosing. Only 79" were provided as a result of the existing condition.

- S: The condition exists only on the top (5<sup>th</sup>) floor. The vertical projection will be painted for visibility and provide warning of a possible hazard.
10. 204 N. Harrison Street Section 313.3 BOCA 1996 9/18/97
- P: The first floor ceiling between the laundry and apartments in an existing R-2 (apartment building) is in poor condition and difficult to fire rate.
- S: The laundry in the business use has an existing plaster ceiling. The applicant opted to fully sprinkle the first floor instead of fire rating the existing ceiling. Fire suppression of the existing R-2 structure is not required.
11. 4213 Hermitage Street Section 1014.11 BOCA 1996 9/3/97
- P: An existing office building exit stair from the second floor is not enclosed and fire rated. The existing open stairway to be continued as the required exit from the second floor.
- S: A sprinkler system will be installed whenever the second floor is occupied.
12. 6400 Midlothian Turnpike Section 503 BOCA 1996 8/19/99
- P: The parapet walls for the existing structure exceed the twenty (20) foot height limitation.
- S: The extension of the parapets does not increase the level of fire hazard. Allowing the parapet excess will not increase the fire hazard of the building.
13. 2701 – 03 Stuart Avenue Section 705 Table 302.1.1 BOCA 1996  
7/15/97
- P: Existing windows would require fire protection of the openings for new construction.
- S: Due to the lack of fire separation an automatic fire detection system (smoke and heat detectors) was installed. The boiler room windows would require protection of openings (sprinkler head/fire shutter), but the windows were required for light and air in the original construction of the building.

14. 1335-63 W. Broad Street Section 1204.1  
6/1/00

P: In the existing structure there is only 6' 9  $\frac{3}{4}$ " of headroom available for the landing area of the exit stair. Seven feet is required for ceiling and 80" is required in all stairs.

S: There are 4 exits available where only 2 are required. The extra exits will reduce the projected density (capacity) of individuals per stair in an emergency situation.

15. 1335-63 W. Broad Street Section 708.3  
6/7/00

P: Firewall openings require protection, often in the form of a fire door or fire shutter.

S: A water curtain is proposed as the fire protection of an opening in a firewall where it is not feasible to attempt the installation of a fire door. The water curtain will protect the opening and the steel support lintel.

16. 2300 E. Cary Street  
3/30/98

P: Height exceeds the limitations of Table 503, even with the sprinkler height modification applied.

S: To allow the 5<sup>th</sup> story, corridor smoke detectors and a voice annunciation fire alarm were added for early warning. This will facilitate a more rapid evacuation of the extra floor.

17. 2300 E. Cary Street  
3/30/98

P: Chapter 11 - BOCA Accessibility would have been technically infeasible for the existing building.

S: BOCA Accessibility Chapter was replaced with the Federal Fair Housing Design Standard for the existing structure. BOCA 1996  
3/30/98

18. 2300 E. Cary Street  
3/30/98

P: Chapter 11 - BOCA Accessibility would have been technically infeasible for the existing building.

S: Building exceeds area limitations; structure has full fire suppression system and automatic fire detection. There is access from the alley, which was not used in the open perimeter calculation. Section 506 BOCA 1996/29/88

19. 2300 E. Cary Street  
3/30/98

P: Buildings on the same lot require an imaginary lot line.

S: Actual distance between buildings is approximately fifteen (15') feet. The code definition of separation distance requires an imaginary lot line, which would reduce the distance to about 9' 9". Section 705.2 BOCA 1996

20. 2300 E. Cary Street  
3/30/98

P: This is a historic building with an existing elevator pit. Any upgrade would require extensive modification.

S: Request exemption from requirement to install a sump pump due to fire alarm, sprinkler and smoke and heat detectors in the elevator shaft and lobbies. A17.1 1993

21. 2300 E. Cary Street  
3/30/98

P: Existing elevator hoist way that requires venting per the current code requirements.

S: For the existing passenger and service elevators, request is made for elimination of the new construction venting requirements. Adding a new exterior opening would compromise the historic quality. A sump pit (with cover) has been added below the floor of the existing pit.  
Section 3007.3 BOCA 1996

22. 501 N. Allen Street Table 503 BOCA 1996

- P: The building is of a 3B construction type, which is not allowed per Table 503 for I-2 use. However the NFPA's Life Safety Code does allow this use in 3B construction.
- S: A fire protection engineer designed a fire suppression system, which would provide protection of the concealed floor joist spaces, to gain a code modification for the construction type restriction.

23. 6 N. 5<sup>th</sup> Street – YMCA Section 1006.0 Means of Egress

- P: The existing historic structure has fire escapes and a main open stair as the primary means of egress. Neither of which is acceptable by current building code.
- S: The building is listed on the Nation Historic Register and the existing means of egress was in compliance at the building's original time of construction. The current use and occupancy are not being changed. Life safety is being improved by a sprinkler system, fire extinguishers, and adding smoke detectors and adding additional exits.



### **Typical Examples of modifications for residential buildings**

1.     2211 & 2217 Fairmont Avenue             Section 302.2 CABO 1995  
  
P: The existing house lies within three feet of the property line and has windows. Openings in exterior walls within 3 feet of the property are prohibited.  
  
S: The existing windows are necessary due to the need for an emergency escape window. The other window provides light for the room, each will be provided with a sprinkler head for protection
  
2.     3015 Barton Avenue                     Section 315.3 CABO 1995  
          11/6/97  
  
P: Existing railings were removed as a part of the porch repair. These railings did not meet the 36" height requirement for a single-family dwelling.  
  
S: The applicant requested permission to re-install those railings to maintain the character of the porch.
  
3.     4608 Sulgrave Road                     Section 314.1 CABO 1995             6/6/02  
  
P: Existing stair is only 34" wide. Code requires stairways to be 36" wide.  
  
S: Upgrade the stairs with new handrails and treads but with will still be less than required 36" width.
  
4.     1710 W. Leigh Street                     Section 314.1 CABO 1995  
          03/20/03  
  
P: Existing windows on exterior wall are within 3' of property line.  
  
S: Install sprinkler heads at windows on exterior wall.

5. 517 N. 24<sup>th</sup> Street Section 315.1 & 315.3 CABO 1995  
12/18/00

- P: Front porch guardrails are 31.5" high and front steps guardrails are 27" high. Code requires guardrails on porches to be 36" minimum in height and guardrails on stairs to be 34" minimum in height.
- S: Because the homeowner was applying for state and federal historical certification the guardrails and columns were restored to the original heights.

Appendix D: Chapter 34 Analysis prepared by Mark Freeman AIA for a building  
in the City of Richmond

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